AMENDMENT TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) A method of processing image data comprising the steps of:

converting ~~broad-range~~ first image data having ~~a broad dynamic range to narrow range~~ a first number of bits to second image data ~~narrower in dynamic range than the broad-range image data~~ having a second number of bits, less than the first number of bits;

inversely converting the ~~narrow-range~~ second image data having the second number of bits to thereby output inversely converted second image data having ~~a same dynamic range as the broad-range image data~~ the first number of bits;

calculating ~~difference data representative of~~ a difference between the ~~broad-range image data~~ information represented by each of the bits of the first image data and the information represented by each of the bits of the inversely converted second image data and outputting the difference as first difference data; and

generating a file ~~that relates~~ including the first difference data, ~~information relating the difference data to said step of converting and the narrow-range image data to one another~~ and a first parameter, the first parameter identifying the first difference data as being calculated using the first image data and the inversely converted second image data, wherein

each bit of image data represents a quantizing level of image data.

2. (Original) The method in accordance with claim 1, further comprising the step of recording the file.

3. (Currently Amended) The method in accordance with claim 1, wherein the ~~broad-range image data relates to the inversely converted image data in such a manner that the broad-ranged~~ first image data can be reproduced by adding the first difference data to the inversely converted second image data.

4. (Currently Amended) The method in accordance with claim 1, wherein

said step of converting comprises the sub-step of linearly converting ~~a~~ the first number of ~~quantizing levels~~ bits of the ~~broad-range~~ first image data to the second number of bits, and said step of inversely converting comprises the sub-step of linearly, inversely converting ~~a~~ the second number of ~~quantizing levels~~ bits of the ~~narrow-range~~ second image data to the first number of bits.

5. (Currently Amended) The method in accordance with claim 1, wherein

said step of converting comprises the sub-step of nonlinearly converting ~~a~~ the first number of ~~quantizing levels~~ bits of the ~~broad-range~~ first image data to the second number of bits, and said step of inversely converting comprise the sub-step of nonlinearly, inversely converting ~~a~~ the second number of ~~quantizing levels~~ bits of the ~~narrow-range~~ second image data to the first number of bits.

6. (Currently Amended) A method of processing image data comprising the steps of:

converting ~~broad range~~ first image data ~~having a broad dynamic range to narrow range~~ having a first number of bits to second image data ~~narrower in dynamic range than the broad range image data~~ having a second number of bits, less than the first number of bits;

inversely converting the ~~narrow range~~ second image data having second number of bits to thereby output inversely converted second image data ~~having a same dynamic range as the broad range image data~~ having the first number of bits;

calculating ~~difference data representative of~~ a difference between the ~~broad range image data~~ information represented by each of the bits of the first image data and the information represented by each of the bits of the and the inversely converted second image data and outputting the difference as first difference data; and

generating a file ~~that relates~~ including the first difference data, ~~information relating the difference data to said step of converting and the narrow range image data to one another~~ and a first parameter, the first parameter identifying the first difference data as being calculated using the first image data and the inversely converted second image data, wherein

said step of converting comprises the sub-step of reducing ~~a~~ the first number of ~~quantizing~~ bits of the ~~broad range~~ first image data beginning with a least significant ~~quantizing~~ bit and continuing in sequence from the least significant bit towards higher order bits until the number of ~~quantizing~~ bits of the ~~broad range~~ first image data becomes equal to ~~a~~ the second number of ~~quantizing~~ bits of the ~~narrow range~~ second image data, and said step of inversely converting comprises the sub-step of adding ZERO bits to ~~a~~ the least significant ~~quantizing~~ bit of

~~the narrow-range~~ second image data until the number of ~~quantizing~~ bits of the ~~narrow-range~~ second image data becomes equal to ~~a~~ the first number of ~~quantizing~~ bits of the ~~broad-range~~ first image data, wherein

each bit of image data represents a quantizing level of image data.

7. (Withdrawn) A method of processing image data comprising the steps of:

nonlinearly transforming a number of quantizing levels of broad-range image data having a broad dynamic range to a number of quantizing levels of narrow-range image data narrower in dynamic range than the broad-range image data;

reducing the number of quantizing bits of the broad-range image data sequentially from a lowermost bit until the number of quantizing bits of the broad-range image data becomes equal to the number of quantizing bits of the narrow-range image data to thereby output residual upper-bit data;

calculating difference data representative of a difference between the narrow-range image data and the upper-bit data; and

generating a file that relates at least lower-bit data omitted by said step of reducing, information relating the lower-bit data to said step of reducing, the difference data, information relating the difference data to said step of nonlinearly transforming and the narrow-range image data to one another.

8. (Withdrawn) The method in accordance with claim 7, further comprising the step of recording the file.

9. (Withdrawn) The method in accordance with claim 7, wherein the broad-range image data is reproducible by adding the difference data to the narrow-range image data and then adding the lower-bit data as lower bits.

10. (Currently Amended) An apparatus for recording image data comprising at least one image processing circuitry and a storage, said at least one image processing circuitry comprising:

a converting circuit for converting input first image data having a first number of bits to output second image data having a ~~smaller number of quantizing levels~~ second number bits, less than the ~~input image data~~ first number of bits, and feeding the output second image data to another image processing circuitry;

an inverse converting circuit for inversely converting the ~~output~~ second image data having the second number of bits to thereby produce inversely converted second image data having ~~a same dynamic range as the input image data~~ the first number of bits; ~~and~~

a calculating circuit for calculating ~~difference data representative of~~ a difference between the information represented by each of the bits of the input first image data and the ~~output~~ information represented by each of the bits of the inversely converted second image data and outputting the difference as first difference data; and

~~said at least one image processing circuitry converting broad-range image data having a broad dynamic range to narrow-range image data narrower in dynamic range than the broad-range image data,~~

~~the narrow-range image data,~~ a file generating circuit for generating a file including the first difference data and ~~information relating the difference data to said converting circuit being recorded in said storage while being related to one another~~ a first parameter, the first parameter identifying the first difference data as being calculated using the first image data and the inversely converted second image data, wherein

each bit of image data represents a quantizing level of image data.

11. (Currently Amended) The apparatus in accordance with claim 10, wherein said converting circuit comprises a linear converting circuit for linearly converting ~~a~~ the first number ~~of quantizing levels~~ bits of the ~~broad-range~~ first image data to the second number of bits, and said inverse converting circuit comprises a linear inverse converting circuit for linearly, inversely converting ~~a~~ the second number of ~~quantizing levels~~ bits of the ~~narrow-range~~ second image data to the first number of bits.

12. (Currently Amended) The apparatus in accordance with claim 10, wherein said converting circuit comprises a nonlinear converting circuit for nonlinearly converting ~~a~~ the number of ~~quantizing levels~~ bits of the ~~broad-range~~ first image data to the second number of bits, and said inverse converting circuit comprises a nonlinear inverse converting circuit for

nonlinearly, inversely converting ~~a~~ the number of ~~quantizing levels~~ bits of the ~~narrow range~~ second image data to the first number of bits.

13. (Currently Amended) ~~And~~ An apparatus for recording image data comprising at least one image processing circuitry and a storage, said at least one image processing circuitry comprising:

a converting circuit for converting input first image data having a first number of bits to output second image data having a ~~smaller number of quantizing levels~~ second number of bits, less than the ~~input image data~~ first number of bits, and feeding the output second image data to another image processing circuitry;

an inverse converting circuit for inversely converting the ~~output~~ second image data having the second number of bits to thereby produce inversely converted second image data having ~~a same dynamic range as the input image data~~ the first number of bits; ~~and~~

a calculating circuit for calculating ~~difference data representative of~~ a difference between the information represented by each of the bits of the input first image data and the ~~output~~ information represented by each of the bits of the inversely converted second image data, both having the first number of bits, and outputting the difference as first difference data; and

~~said at least one image processing circuitry converting broad range image data having a broad dynamic range to narrow range image data narrower in dynamic range than the broad range image data,~~

~~the narrow-range image data,~~ a file generating circuit for generating a file including the first difference data and ~~information relating the difference data to said converting circuit being recorded in said storage while being related to one another~~ a first parameter, the first parameter identifying the first difference data as being calculated using the first image data and the inversely converted second image data, wherein

each bit of image data represents a quantizing level of image data, and

said converting circuit comprises a circuit for reducing ~~a~~ the first number of ~~quantizing~~ bits of the ~~broad-range~~ first image data beginning with a least significant quantizing bit and continuing in sequence from the least significant bit towards higher order bits until the number of ~~quantizing~~ bits of the ~~broad-range~~ first image data becomes equal to ~~a~~ the second number of ~~quantizing~~ bits of the ~~narrow-range~~ second image data, and said inverse converting circuit comprises a circuit for adding ZERO bits to ~~a~~ the least significant ~~quantizing~~ bit of the ~~narrow-range~~ second image data until the number of ~~quantizing~~ bits of the ~~narrow-range~~ second image data becomes equal to ~~a~~ the first number of ~~quantizing~~ bits of the ~~broad-range~~ first image data.

14. (Withdrawn) An apparatus for recording image data comprising at least one image processing circuitry and a storage, said at least one image processing circuitry comprising:

a nonlinear transforming circuit for nonlinearly transforming input image data to output image data having a smaller number of quantizing levels than the input image data and feeding the output image data to another image processing circuitry;

a reducing circuit for reducing the number of quantizing bits of the input image data sequentially from a lowermost bit until the number of quantizing bits of the broad-range image data becomes equal to the number of quantizing bits of the output image data to thereby output residual upper-bit data; and

a calculating circuit for calculating difference data representative of a difference between the output image data and the upper-bit data;

said at least one image processing circuitry transforming broad-range image data having a broad dynamic range to narrow-range image data narrower in dynamic range than the broad-range image data, and

at least the narrow-range image data, the lower bits omitted by said reducing circuit, information relating the lower bits to said reducing circuit, the difference data and information relating the difference data to said transforming circuit being recorded in said storage while being related to one another.

15. (Previously Presented) The method in accordance with claim 6, further comprising the step of recording the file.

16. (Currently Amended) The method in accordance with claim 6, wherein the broad-range ~~image data relates to the inversely converted image data in such a manner that~~ the ~~broad-ranged~~ first image data can be reproduced by adding the first difference data to the inversely converted second image data.